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ABSTRACT

The relationship between cognitive style (field independence/field dependence), proctor/student interactions, and achievement of undergraduate students in a Personalized System of Instruction (PSI) course was studied. Field dependence/independence was measured using the Group Embedded Figures Test (GEFT), which measures ability to identify a simple geometric figure visually imbedded in a complex design. Three categories of proctor/student interactions were identified: (1) specific to the course activities or objectives; (2) related to the content but not directly to course activities; and (3) unrelated to the course interactions. Proctors observed and recorded student-initiated interacticns. Results showed significant differences in social behaviors, but not achievement, between the two groups. Among field-dependent students there was a significantly greater tendency to obtain specific course information through social contacts initiated with proctors. The PSI course accommodated a wide range of learning styles, suggesting that social behavior may be a means of adapting to various instructional settings. (LMM)

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THE RELATIONSHIP OF COGNITIVE STYLE TO THE FREQUENCY OF PROCTOR/STUDENT INTERACTIONS AND ACHIEVEMENT IN A PSI COURSE

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This study investigates the relationship between cognitive style, field independence-field dependence, proctor/student interactions and achievement of undergraduate students in a Personalized System of Instruction (PSI) course (Keller, 1968). The results should help identify how cognitive style influences behavior in different instructional settings and may further reveal the importance of matching students' learning styles and instructional methods.

Cognitive Style

Field independence-field dependence, the cognitive style examined in this study, was measured by the Group Embedded Figures Test (GEFT) (Witkin, Oltman, Raskin, & Karp, 1971). This test measures a persons ability to identify a simple geometric figure visually embedded in a complex design. The higher a person scores on the test, the more field independent the individual. Field independent persons are those who tend to process information with greater isolation from their environment. Thus, they have been shown to have less sensitivity to social cues and less developed interpersonal skills; they tend to process information more analytically since parts of their environment are more apparent to them. Field dependent persons (lower score on the GEFT) are those persons who tend to process information with a greater connectedness with their environment. This has been shown to foster the development of a more personal orientation and an ability to get along with others, which is used, in many instances, to help them structure their experiences (Witkin, Moore, Goodenough, & Cox, 1977). In regards to achievement, Wachtel (1968) stated that tests of field dependence can be viewed as tests of ability and cited correlations with some standardized tests and

academic ability to support this argument.

Since field dependent persons rely on external sources of information to help them structure their experience, and since the PSI setting provides an opportunity for interaction to occur which might be helpful in obtaining this information, the social behaviors of field dependent students in a PSI setting can be expected to differ from those of field independents. Specifically, the question to be answered by the present day study was: Will course achievement be affected by the differing social behaviors of students?

Method

Sample

Subjects of the study were 53 male undergraduates enrolled in three sections of a college course using a PSI methodology. The participants were sophomores, juniors, and seniors majoring in either industrial teacher education or industrial technology. The course is required for both academic majors.

Instructional Methods

The course, Cybernetics, met six hours a week for 10 weeks. Most of the instructional activities involved the use of sophisticated laboratory equipment; thus, students performed most course requirements in an open laboratory setting.

In the laboratory, students were free to interact with each other and often entered and left at will. Three proctors were stationed in the laboratory to assist with the performance of the instructional activities, answer questions, and administer tests. Lectures were conducted periodically in an

adjoining classroom.

Procedures

During the first class period of the three sections of the course, the Group Embedded Figures Test (GEFT) was administered to students. Scores on the GEFT can range from zero to 18. Witkin, et al. (1971) report a normative score of 12 for males in a liberal arts college. This score has been used in numerous studies to identify field dependent and field independent persons. The participants in this study were assumed to represent a population that characteristically scores higher on tests such as the GEFT (e.g., Barrett & Thornton, 1967). Therefore, a score of 13 or below was used to classify field dependent students while those scoring above 13 were classified as field independent students.

Dependent Variables

Achievement was measured through the use of the final grade in the course and Grade Point Average (GPA). To measure the frequency of proctor/student interactions, three categories of interactions which were assumed to occur in the PSI setting were identified: a) *Specific* to the course activities or objectives; b) *Related* to the content in some manner, but not directly related to the course activities, and, c) *Unrelated* to the course interactions concerned with non-academic matters.

These variables were operationalized by having proctors observe and record the interactions which students initiated with them. Proctors were provided with a pocket-sized notebook which they carried with them during the laboratory sessions. After an interaction occurred, the proctor recorded the following information in the notebook: the name of the student, the date of the interaction, and the category of the interaction.

The reliability of proctors observations was of special concern in this study. As such, proctors were trained before the course and provided opportunities to discuss special cases during the course. In addition, proctors were observed in the laboratory setting by the investigator. At the end of each observed session, the observer and the proctors compared their records. The reliability of proctors' observations was computed from these comparisons.

Results

The results of the study were as follows:

1. There was a total of 23 field dependent and 30 field independent students from the three sections of the course.
2. There were no significant differences between groups of students in their final grades (t (52) = 1.01, p = .99) or GPA's (t (52) = 1.15, p = .41).
3. There were no significant differences between groups of students in their final grades while using GPA as a covariate, (F (1, 50) = .676, p = .41).
4. There was significant rating agreement between the interactions recorded by the proctors and the observer, r = .94 ($p < .01$).
5. Using the MANOVA procedure, there was a significant multivariate F ratio between field dependent and field independent students when all sections were combined. The univariate F ratio for the *Specific* interaction variable was significant in all sections.
6. Using the discriminant analysis procedure, the number of *Specific* interactions initiated by students was significant in discriminating between the two groups in all three sections.

7. The standardized discriminant function coefficient loaded in the heaviest for field dependent in all sections. The *Unrelated* interaction variable was significant in one of the three sections.

Discussion

The results of this study indicate that there were significant differences in the social behaviors between the two groups of students within the PSI course. And, the groups did not differ in their achievement. Among field dependent students there was a significantly greater tendency to obtain specific course information through social contacts initiated with proctors. There were no significant differences in the frequency of *Related* or *Unrelated* interactions.

The results may provide a case in point of how persons' behavior will vary in the extent to which they rely on external referents in the setting. Witkin, et al. (1977) report that field dependents tend to seek information from those persons who are seen as valid sources of information. Presumably, field dependent students viewed the proctors as valid sources of information and used their (the students') more developed social skills to obtain this information. Field independents have learned to rely on internal referents to either obtain information or to structure their experiences. Thus, they were shown to initiate fewer interactions with proctors.

The results have added meaning since students did not differ in their achievement. Therefore, within this PSI self-paced course, a wide range of "learning styles" were accomodated. This suggests that social behavior may be one way in which students adapt to various instructional settings and, thus, should be of concern to course developers and instructors.

While the results are consistent across three sections, the sample sizes were much smaller than recommended. Cronbach and Snow (1977) recommend that in order to achieve statistical power, at least 100 subjects be used per treatment. Therefore, the results reported must be viewed with caution. It would be fruitful and prudent to conduct additional research with larger smaple sizes.